

I claim:

1) A mobile device useful for on-site mixing of concrete precursors to form a fresh concrete which comprises a wheeled-base portion that further includes:

- 5        a) at least one storage compartment for containing a concrete precursor, wherein said storage compartment comprises a bottom portion having an outlet portion;
- b) a conveyor belt means having a receiving end and a discharge end, said conveyor belt means being disposed beneath said storage compartment in sufficient proximity to the outlet portion of the storage compartment to receive a
- 10      quantity of said concrete precursor, with the concrete precursor comprising a portion that contacts the conveyor belt means and a top surface portion;
- c) at least one adjustable gate means disposed along the travel path of said conveyor in a position that is above the conveyor belt and in contact with the top surface of said quantity of said concrete precursor;
- 15      d) a cement powder storage compartment having an outlet, wherein said outlet is disposed in sufficient proximity to deliver a quantity of cement powder to the top surface of said concrete precursor as it travels along said conveyor, wherein said outlet of said cement powder storage compartment includes an airlock rotary vane feeder;
- 20      e) an auger inlet chamber having a bottom portion and disposed at the delivery end of said conveyor belt means, which inlet chamber is adapted to receive the cement powder and concrete precursor from the delivery end of the conveyor belt means, wherein said auger inlet chamber includes a means for adding a desired

quantity of water to said cement powder and concrete precursor which enters said inlet chamber; and

f) a screw auger having an inlet end and an outlet end, wherein said inlet end is disposed in the bottom of said auger inlet chamber and is adapted to receive said cement powder, concrete precursor, and water,

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from which fresh concrete may be caused to emerge from said outlet end of said screw auger during its rotation.

10 2) A mobile device according to claim 1 and further comprising:

g) a means for conveying fresh concrete which exits the outlet end of said screw auger to a road surface.

15 3) A mobile device according to claim 1 wherein said means for conveying fresh concrete comprises a chute.

4) A mobile device according to claim 1 wherein said storage compartment includes a concrete precursor that comprises one or more materials selected from the group consisting of: coarse aggregates and fine aggregates.

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5) A mobile device according to claim 4 wherein said conveyor belt means has a width dimension of any width between about 18.00 inches and 40.00 inches, including every

hundredth inch therebetween, and wherein said conveyor belt is caused to move at a linear rate of travel of any rate between 0.5 and 1000 feet per minute.

6) A mobile device according to claim 2 wherein said device is effectively connected to a  
5 truck, which truck is moving at a rate of speed of any rate between 0.10 miles per hour and 10 miles per hour.

7) A mobile device according to claim 1 wherein said storage compartment comprises a plurality of compartments, separated by at least one partition means.

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8) A mobile device useful for on-site mixing of concrete precursors to form a fresh concrete which comprises a wheeled-base portion that further includes:  
a) at least one storage compartment for containing a concrete precursor, wherein said storage compartment has a bottom portion having an outlet, and wherein said storage compartment contains a concrete precursor that comprises one or more materials selected from the group consisting of: coarse aggregates, or fine aggregates;

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b) a conveyor belt means having a receiving end and a discharge end, said conveyor belt means being disposed beneath said storage compartment in sufficient proximity to the outlet portion of the storage compartment to receive a quantity of said concrete precursor, with the concrete precursor comprising a portion that contacts the conveyor belt means and a top surface portion, and wherein said conveyor belt means has a width dimension of any width between

about 18.00 inches and 40.00 inches, including every hundredth inch therebetween, and wherein said conveyor belt moves at a linear rate of travel of any rate between 0.5 and 1000 feet per minute;

c) an adjustable gate means disposed along the travel path of said conveyor in a position that is above the conveyor belt and in contact with the top surface portion of said concrete precursor;

d) a cement powder storage compartment having an outlet, wherein said outlet is disposed in sufficient proximity to deliver a quantity of cement powder to the top surface of said concrete precursor as it travels along said conveyor, wherein said outlet includes an airlock rotary vane feeder;

e) an auger inlet chamber having a bottom portion and disposed at the delivery end of said conveyor belt means, which inlet chamber is adapted to receive the cement powder and concrete precursor from the delivery end of the conveyor belt, wherein said auger inlet chamber includes a means for adding a desired quantity of water to said cement powder and concrete precursor which enters said chamber;

f) a screw auger having an inlet end and an outlet end, wherein said inlet end is disposed in the bottom of said auger inlet chamber and is adapted to receive said cement powder, concrete precursor, and water, wherein fresh concrete is caused to emerge from said outlet end of said screw auger during its rotation; and

g) a means for conveying fresh concrete which exits the outlet end of said screw auger to a road surface,

wherein said device is effectively connected to a truck which is moving at a rate of speed of any rate between 0.10 miles per hour and 10 miles per hour.

9) A process for producing a set concrete structure which comprises the steps of:

- 5        a) providing a mobile device according to claim 1;
- b) directing said fresh concrete emerging from said device to an excavation or hole in the ground;
- c) forming the surface of said concrete into a desired form; and
- d) allowing said concrete to harden or set.

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10) A process according to claim 9 wherein said concrete has an early strength of at least 3000 psi after a time period no greater than 90 minutes.

11) A process according to claim 9 wherein said concrete structure is selected from the  
15 group consisting of: roads, road patches, airport surfaces, chemical plants, and pipeline ditch fills.

12) A process according to claim 11 in which said concrete structure is a road, and  
wherein said concrete is produced at a rate of 1 to 90 cubic yards per hour.

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- 13) A process for producing a set concrete structure which comprises the steps of:
- a) providing a mobile device according to claim 8;
  - b) directing said fresh concrete emerging from said device to an excavation or hole in the ground;
  - 5 c) forming the surface of said concrete into a desired form; and
  - d) allowing said concrete to harden or set.

- 14) A process for producing a set concrete structure which comprises the steps of:
- a) providing a mobile device according to claim 1;
  - b) directing said fresh concrete emerging from said device to an excavation or hole in the ground;
  - 10 c) forming the surface of said concrete into a desired form; and
  - d) allowing said concrete to harden or set.

- 15 15) A process according to claim 14 wherein said concrete has an early strength of at least 3000psi after a time period no greater than 90 minutes.

- 16) A process according to claim 14 wherein said concrete structure is selected from the group consisting of: roads, road patches, airport surfaces, chemical plants, and pipeline  
20 ditch fills.

- 17) A process according to claim 16 in which said concrete structure is a road, and wherein said concrete is produced at a rate of 1 – 90 cubic yards per hour.

- 18) A mobile volumetric mixing plant for producing and laying concrete comprising:
- a) a plant motion truck;
  - b) a first conveyor means having a receiving end and a discharge end wherein said first conveyor means is disposed over the top of said plant motion truck and is oriented so that its receiving end is disposed in the front of said truck and its discharge end is disposed to the rear of the truck's cab;
  - c) a second conveyor means having a receiving end and a discharge end, wherein the receiving end of the second conveyor means is disposed to receive the materials discharged from the discharge end of said first conveyor means;
  - d) a concrete plant coupled to said plant motion truck, wherein said concrete plant comprises:
    - i) a cement powder storage compartment having a top portion and an outlet portion, wherein said outlet portion includes a rotary vane feeder for metering cement which exits said cement powder storage compartment;
    - ii) at least one concrete precursor storage compartment having a top portion comprising an opening;
    - iii) a third conveyor means for transferring cement powder and concrete precursors from their respective storage compartments, wherein said third conveyor means has a receiving end portion and a delivery end portion;
    - iv) a gate for metering the height of concrete precursor(s) atop said third conveyor means;
    - v) means for providing water to the concrete precursors and cement powder conveyed by said third conveyor means;

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- vi) a mixing auger having an inlet portion and an outlet portion, wherein said inlet portion of said mixing auger is disposed at the delivery end of said third conveyor means to receive the water, concrete precursors, and cement powder; and
- 5           vii) a means for transferring concrete having an inlet and an outlet, wherein said inlet is disposed to be adapted to receive fresh concrete which exits the outlet portion of said mixing auger, and wherein said outlet of said means for transferring is disposed sufficiently to enable said fresh concrete to be used in forming a road surface;
- 10          wherein said opening of said concrete precursor storage compartment is disposed to receive raw materials from the discharge end of said second conveyor means; and
- 15          d) a supply truck, having contents selected from the group consisting of: aggregates or other solids, said supply truck including a storage vessel which includes a discharge portion, wherein the discharge portion of the supply truck is in sufficient proximity to the loading end of the first conveyor means to enable the contents of the storage vessel of the supply truck to enter said first conveyor means.
- 20          19) A mobile volumetric mixing plant as in claim 18 wherein said plant motion truck and said supply truck are both caused to be in motion at the same speed relative to the ground.

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- 20) A process for producing a set concrete structure which comprises the steps of:
- a) providing a mobile device according to claim 18;
  - b) directing said fresh concrete emerging from said device to a location selected from the group consisting of: an excavation, hole in the ground, or into the inlet of a concrete pump.
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- 21) A process according to claim 20 wherein said concrete has an early strength of at least 3000 psi after a time period no greater than 90 minutes.
- 10 22) A process according to claim 20 wherein said concrete structure is selected from the group consisting of: roads, road patches, airport surfaces, industrial chemical plants, refineries, commercial buildings, and pipeline ditch fills.
- 15 23) A process according to claim 22 in which said concrete structure is a road, and wherein said concrete is produced at a rate of 1 – 90 cubic yards per hour.
- 24) A process according to claim 20 wherein said plant motion truck and said supply truck are both caused to be in motion at the same speed relative to the ground.
- 20 25) a process according to claim 20 further comprising the steps of:
  - c) forming the surface of said concrete into a desired form; and
  - d) allowing said concrete to harden or set.

26) A process for laying a road surface or the like which comprises the steps of:

a) providing a cement powder;

b) providing at least one material selected from the group consisting of:  
coarse aggregates or fine aggregates;

5 c) providing water,

wherein said cement powder, said at least one of coarse aggregates or fine aggregates,  
and said water are contained on a moveable platform,

d) mixing said cement powder with water, and said at least one of coarse  
aggregates or fine aggregates in an auger mixer so as to form a fresh concrete product;

10 e) transferring said fresh concrete product to a location on the ground within 50  
feet of the point at which said fresh concrete exits said auger, which has been  
prepared to receive a concrete from which a road surface or the like is to be made;

f) finishing the surface of said concrete;

g) permitting said concrete to set,

15 h) replenishing said cement powder, said at least one of sand, gravel, or  
aggregate, and said water to said platform on which they are contained in the  
quantities in which they are consumed, as they are consumed, in order to provide  
a continuous source of fresh concrete during a road surfacing operation,

wherein said moveable platform is caused to be in motion with respect to the ground at

20 any rate between 0.10 and 10.0 miles per hour.